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Past is prologue: The role of memory retrieval in young children's episodic prospection



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ABSTRACT

Prior research has revealed a strong link between the ability to remember one's past (i.e., episodic memory) and the ability to envision one's future (i.e., episodic prospection). Indeed, the past holds valuable learning experiences that can inform future choices and plans. Although these abilities both emerge during preschool years, there exist few theoretical accounts of how memory processes might support developmental improvements in prospection abilities. We developed a novel paradigm to determine whether young children (3 and 4 years of age) use past knowledge to inform future choices. Experiment 1 revealed that children find it more difficult to retrieve relevant information from their past when they envision the future versus reflect on the past. Experiment 2 facilitated children's access to past event components and, thereby, eased retrieval of relevant components from memory for future event construction. We discuss results in light of recent proposals on the development of episodic prospection.

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Introduction

It is impossible to plan for personal goals, to predict outcomes of actions, and to imagine who you might become in the future without considering information from your past. Episodic prospection reflects the ability to imagine yourself in the future and generate scenarios that depict how your future might unfold. Mental representations of the future incorporate episodic information (the who, what,

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where, and when of a particular event) that is retrieved from memory and bound together to generate plausible personal future events (Klein, Cosmides, Tooby, & Chance, 2002; Klein, Robertson, & Delton, 2010; Tulving, 2002). During early childhood, episodic prospection emerges by 3 years of age, a time when episodic memory abilities have already begun to take shape (see Bauer, 2007, and Hudson, Mayhew, & Prabhakar, 2011, for reviews). Still, little is known about how emerging memory abilities are harnessed by young children to retrieve episodic information from the past to build representations of the future (but see, e.g., Atance & Sommerville, 2014; Richmond & Pan, 2013). The current study sought to address this gap in the literature and investigate how memory processes contribute to the emergence of episodic prospection during early childhood.

By 3 years of age, children can form episodic memories (Bauer & Dow, 1994; Bauer, 2007; Hayne & Imuta, 2011; Hayne, Gross, McNamee, Fitzgibbon, & Tustin, 2011; Morgan & Hayne, 2011; Scarf, Gross, Colombo, & Hayne, 2011) and verbally report events that occurred far in the past (Fivush & Schwarzmueller, 1998; Fivush, Gray, & Fromhoff, 1987; Harley & Reese, 1999; Reese & Brown, 2000; Tustin & Hayne, 2010). Between 3 and 4 years of age, children begin to make appropriate choices in the present in apparent anticipation of their personal future (Atance & Meltzoff, 2005; Hudson & Fivush, 1991; Hudson, Fivush, & Kuebli, 1992; Hudson & Shapiro, 1991; Prabhakar & Hudson, 2014; see Hudson et al., 2011, for a review). Recent work has sought to bridge these two lines of research to understand how the development of episodic memory processes might inform development of episodic prospection. For example, Atance and Sommerville (2014) found that age-related improvement in episodic prospection was predicted by age-related improvement in episodic memory during preschool years. Likewise, Richmond and Pan (2013) found that children who provided greater episodic detail when remembering a past event also reported greater episodic detail when imagining a future event.

Moving beyond correlational associations between episodic memory and episodic prospection, researchers have examined whether children use past information to inform the future (Atance, Louw, & Clayton, 2015; Russell, Alexis, & Clayton, 2010; Suddendorf, Nielson, & von Gehlen, 2011). Much of this work has indicated that younger children have greater difficulty in making appropriate future choices than older children (Russell et al., 2010; Suddendorf et al., 2011) and that imagining the future is more difficult than remembering the past (Atance et al., 2015). For example, in a study by Suddendorf et al. (2011), 3-year-olds had difficulty in retrieving past information after a delay when making a future-directed choice, whereas 4-year-olds did not exhibit the same difficulty. This study suggests that children's ability to retrieve information from past experiences to inform future decisions may be a function of the strength of their memory for those past experiences.

However, recently, Atance et al. (2015) reported that children have difficulty in making appropriate future decisions even when they can successfully remember this information. These authors asked preschoolers to remember two past experiences—one in an empty room with no toys and a second in a different room filled with toys—and then to decide where to leave a toy for a future visit. They found that whereas both age groups remembered the contents of the rooms, only 4-year-olds used that information to make an appropriate future-directed choice (i.e., to leave a toy in the room that was empty during their first experience). This study indicates a possible disconnection between how memory retrieval processes are employed when younger children remember the past and imagine the future. One method to examine such a disconnection would be to test whether there are differences in the memory processes associated with remembering a past experience versus imagining a similar future one. The current study was designed to explore this distinction.

It is likely that the process that results in successful retrieval of relevant episodic details during recall of a past experience differs from the retrieval process that occurs when young children imagine the future. Past events have precise content units (e.g., an exact time, place, people, and items) that can serve as cues to guide retrieval. Because a future event has yet to occur, these precise content cues may be less available to younger children, resulting in a more difficult retrieval process for relevant information. This hypothesis accords with previous research indicating that young children rely on multiple cues for memory retrieval, without which successful retrieval fails (Hayne, Boniface, & Barr, 2000; Herbert & Hayne, 2000; Lloyd, Doydum, & Newcombe, 2009; Morgan & Hayne, 2006; Scarf et al., 2011). It is possible that younger children require greater ostensible cues to engage an effective retrieval process when they are oriented toward a future event that has fewer precise content

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